Energy for Hawaii

Workshop on Interconnecting Distributed Energy
December 12-13, 2001
Sheraton Waikiki Hotel

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Overview

- **Hawaii's Energy Situation**
- **Challenges and Opportunities in the Electricity Sector**
- **Distributed Energy**
  - **Potential Benefits**
  - **Barriers**
  - **DBEDT Project**

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State of Hawaii Energy Objectives

- **Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people**
- **Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased**
- **Greater energy security in the face of threats to Hawaii's energy supplies and systems**
- **Avoid, reduce, or sequester greenhouse gas emissions that contribute to global climate change**

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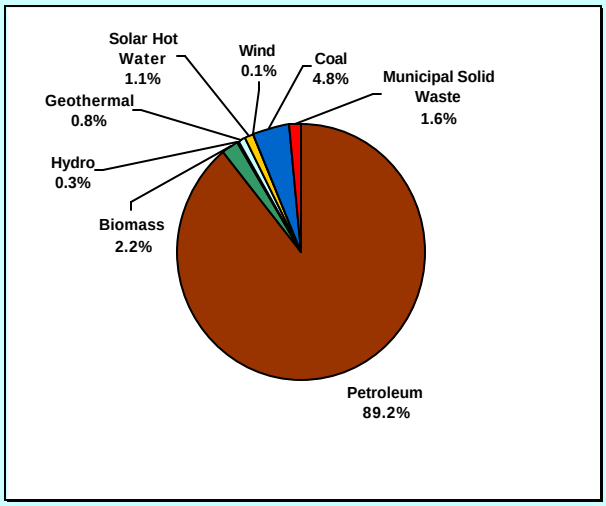
Statewide Energy Sources 2000



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Imported Fossil Fuels: Crude Oil, Refined Petroleum Products, and Coal

Crude Oil Imports to Hawaii 2000		
Source	Barrels	% of Total
United States	15,303,000	30.7%
China	11,493,000	23.0%
Indonesia	8,557,000	17.1%
Australia	7,415,000	14.9%
Malaysia	2,975,000	6.0%
Thailand	1,103,000	2.2%
Argentina	1,072,000	2.1%
Vietnam	936,000	1.9%
Papua New Guinea	651,000	1.3%
Venezuela	403,000	0.8%
Total	49,908,000	

Refined Oil Product Imports to Hawaii 2000		
Source	Barrels	% of Total
United States	3,402,000	39.7%
South Korea	1,986,000	23.2%
Japan	1,810,000	21.1%
Indonesia	840,000	9.8%
Saudi Arabia	294,000	3.4%
Singapore	168,000	2.0%
Netherlands Antilles	75,000	0.9%
Total	8,575,000	

Imported Coal Used in Hawaii, 2000		
Source	Tons	% of Total
Indonesia	658,000	89%
Australia	77,486	11%
	735,486	

Sources: Refiner Reports to EIA

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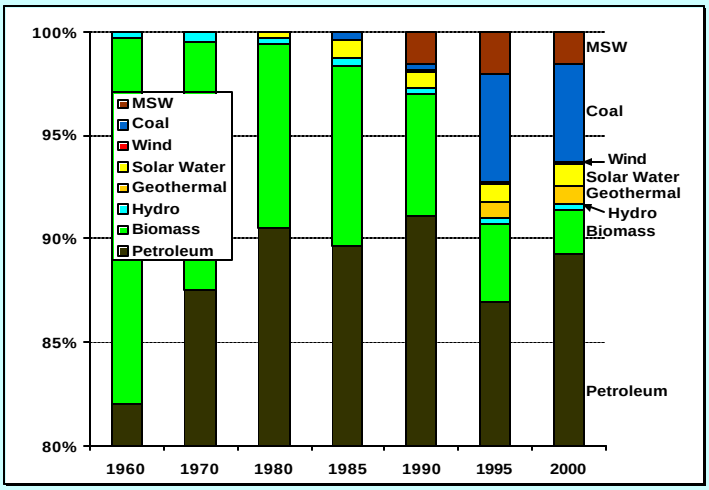
Statewide Energy Sources 1960-2000



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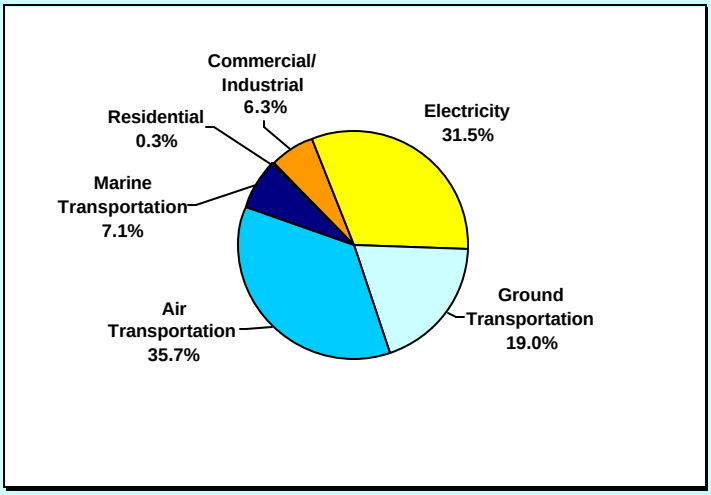
Statewide Oil Consumption by End-Use Sector 2000



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Hawaii's Energy Challenges

- 89.2% dependence on oil for energy
- Aviation and marine fuel beyond State control
- Ground transportation:
  - Gasoline and diesel demand increasing
  - Vehicle efficiency decreasing
  - Limited production of alternative fuels
- Electricity largely generated by imported fuels

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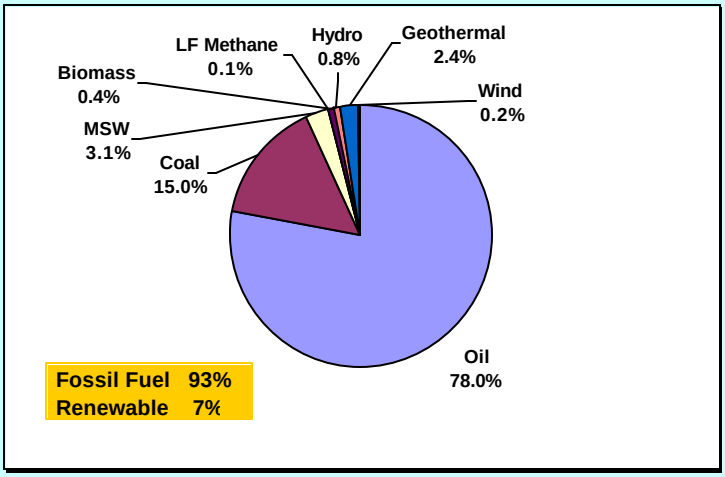
Statewide Electricity Generation for Utility Sale, by Fuel, 2000



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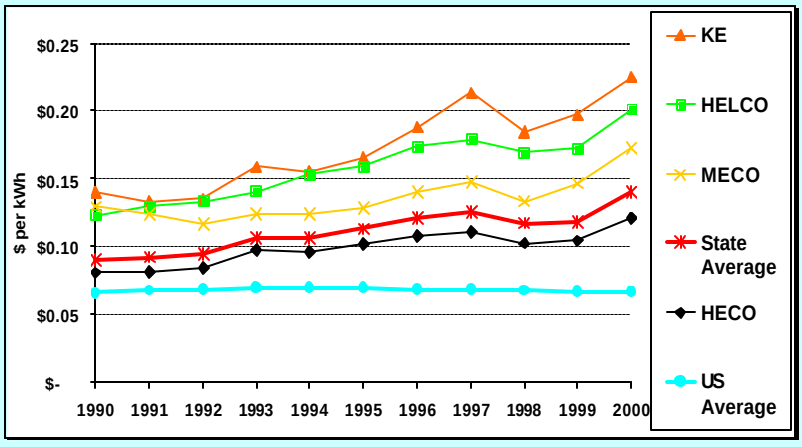
Average Electricity Costs in Hawaii, 1990-2000



Sources: Utility FERC Form 1, Annual Reports to PUC, and Energy Information Administration

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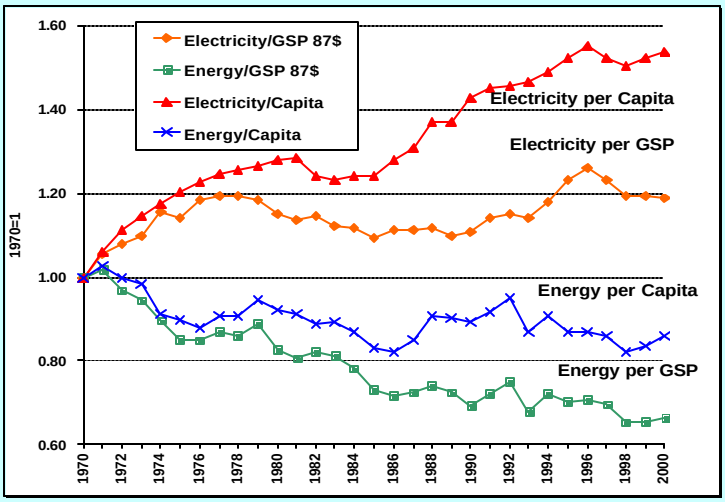
Changes in Energy and Electricity Intensity in Hawaii, 1970 - 2000



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Considerations for Future Action

- **Hawaii has highest electricity prices and very high other energy prices -- but demand is inelastic and increasing**
- **Electric utility 20-year plans call for meeting new demand with fossil-fired generation**
- **There are significant opportunities remaining for economical energy efficiency, distributed energy, and renewable energy**
- **DBEDT Renewable Energy Resource Assessment shows**
  - Significant wind and solar resources
  - Potential for biomass energy
  - Potential for additional geothermal on Island of Hawaii
- **Costs of technologies are changing at different rates**

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Challenges in the Electricity Sector

- **Utility controls market conditions**
  - Private renewable energy projects compete with utility projects
  - Contracts must be secured from regulated monopoly
- **Project funding is difficult**
  - Funding for new technology is hard to obtain
  - State is actively seeking partnerships and assistance
- **Possible future electricity system restructuring**
  - Current cost of service regulation offers little incentive for reducing costs or greater efficiency
  - Renewable energy may be encouraged through Renewable Portfolio Standards and Net Metering Legislation passed this Session

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Additional Challenges: Siting and Project Permitting

- **Difficulty in obtaining suitable sites**
- **Public opposition to new development**
- **Length of project permitting process**
  - Streamlining the process could help
- **Small, on-site projects avoid some of the challenges faced by large, utility-scale projects**
  - Land and permitting costs may be reduced
  - Transmission losses reduced
  - Site-specific resources can be utilized

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Legislation in 2000 Session Facilitates Distributed Energy and Renewables

- **Act 289**
  - **Provides investment credit for qualifying ethanol production facilities**
- **SCR 183**
  - **Requests DBEDT conduct a study on hydrogen use for transportation fuel and power generation**

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Legislation in 2001 Session Facilitates Distributed Energy and Renewables

- **Act 143**
  - Encourages alternative fuels by adjusting highway taxes to reflect the energy content of the fuels and reducing fuel taxes for several years.
- **Act 175**
  - Provides 4% tax credit for technology infrastructure renovation costs including backup and emergency power systems. Expands definition of "qualified high technology business" to include "non-fossil fuel energy related technology."
- **Act 272**
  - Requires electric utilities to set renewable portfolio standard goal of 7% of electricity sales by 12/31/03, 8% by 12/31/05, and 9% by 12/31/10
  - Provides "net energy metering" for eligible customer-generators up to 0.5% of electric utility's peak demand
- **Act 283**
  - Establishes public/private partnership to support and promote hydrogen use in Hawaii and appropriates $200,000 to DBEDT for stakeholder workshop, policy study, assessments, and projects.

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Potential Benefits of Distributed Energy

- **Greater diversification and energy efficiency**
  - Renewable energy
  - Combined heat and power
- **High power quality**
- **Increased reliability**
  - For facility (backup power)
  - For system (decentralization)
- **Potentially lower costs**
  - Time of use rates could help overall system efficiency
  - Reduce need for additional utility peaking generation
  - Reduce transmission losses

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Distributed Energy Resources Are Part of the Nation's Energy Future

The U.S. Department of Energy envisions:

"by 2020, the United States will have a flexible, secure, efficient, and reliable energy infrastructure by optimizing the use of distributed energy resources (DER). At the heart of this vision is the goal of meeting 20% of the nation's generating capacity additions with DER by the year 2010."

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Barriers to Distributed Energy

- **Interconnection with the grid**
- **Utility pricing practices and tariff structures**
- **Siting, permitting, and environmental regulation**
- **New business models and practices are needed to appropriately value distributed energy**

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DBEDT Project: Creating Distributed Generation Opportunities for Hawaii

- **Consultant: Global Energy Partners, LLC**
  (an EPRI/GRI company)
- **Results - by end of 2002**
  - Analysis of distributed energy (DE) opportunities and market in Hawaii
  - Description of siting, permitting, regulatory, interconnection, and social barriers to increasing use of DE technologies
  - Recommendations to Governor, Legislature, County governments, and regulatory agencies on actions that need to be taken to facilitate increased use of DE technologies

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Conclusions

- **Hawaii remains highly dependent on oil**
- **Hawaii has diversified its energy supply**
- **There are additional opportunities for efficiency and diversification**
- **Many challenges remain to be met in the quest to reduce reliance on imported oil**
- **Increased use of distributed energy could provide several benefits to Hawaii's energy systems, businesses, and environment**
- **Your participation is important**

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